

FIG. 1

Growth parameters and characterization results of Samples A-D

	Sample A	Sample B	Sample C	Sample D
Final Ge composition	100%	100%	50%	100%
Grading rate (%Ge μm^{-1})	5	10	10	10
Total epitaxial thickness (μm)	23	12	6.5	12
Growth temperature ($^{\circ}\text{C}$)	750	800	750	50-76%: 750 76-100%: 550
Growth pressure (mT)	25	50	25	50-76%: 25 76-100%: 3
CMP at 50%	No	No	—	Yes
Threading dislocation density (cm^{-2})	$1\pm0.1\times10^7$	$1-5\times10^7$	$6.3\pm0.1\times10^6$	$2.1\pm0.2\times10^6$
Crack density (cm^{-1})	47 ± 5	0	0	0
Particle density (cm^{-2})	1250 ± 100	600 ± 40	50 ± 5	150 ± 10
RMS roughness (nm)	35.9	47	37.3	24.2
a_{\perp} of top layer (\AA)	5.6559	5.6558	5.5327	5.6597
$a_{ }$ of top layer (\AA)	5.6559	5.6552	5.5352	5.6409

FIG. 2

FIG. 3

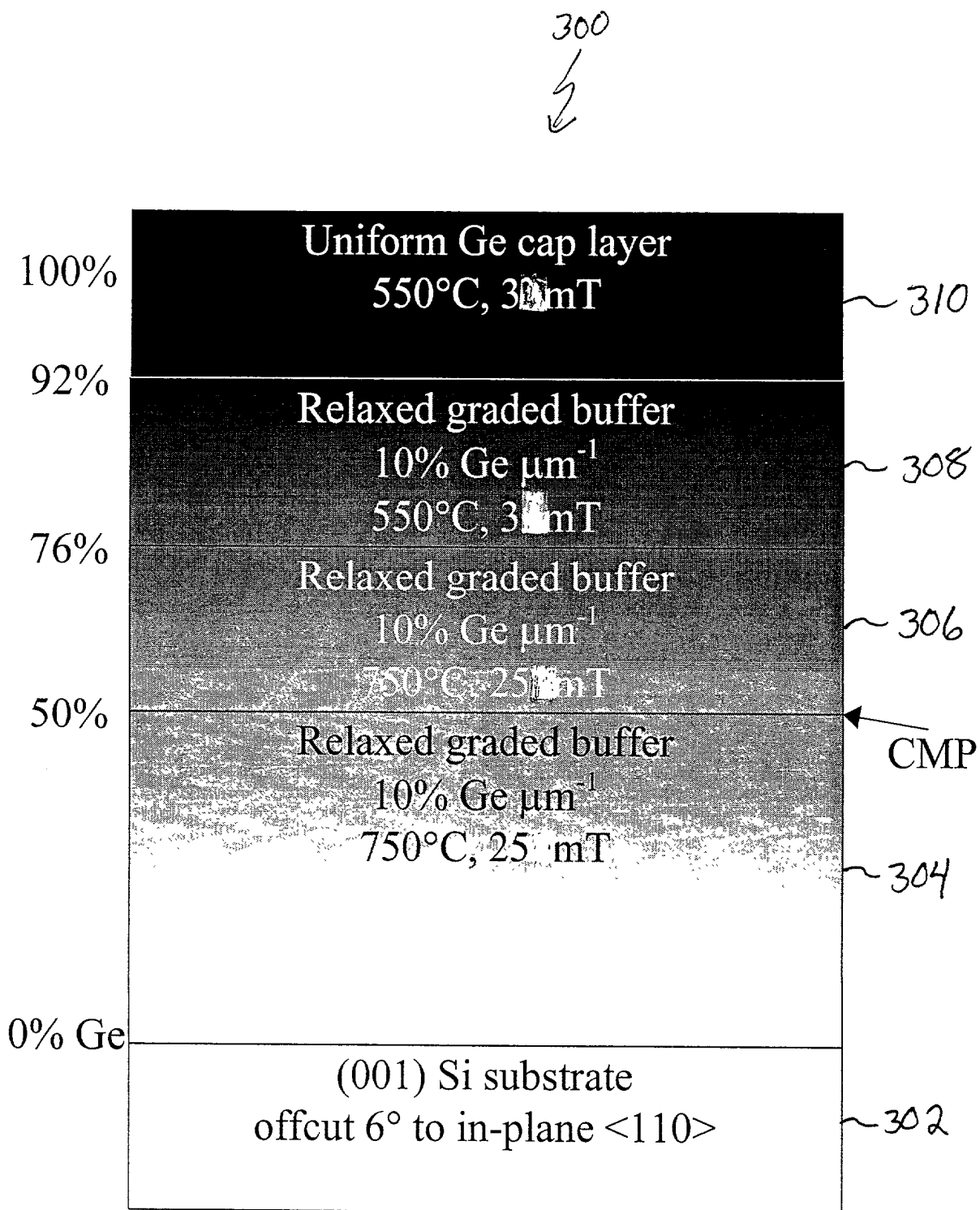


FIG. 3

10022689 421701

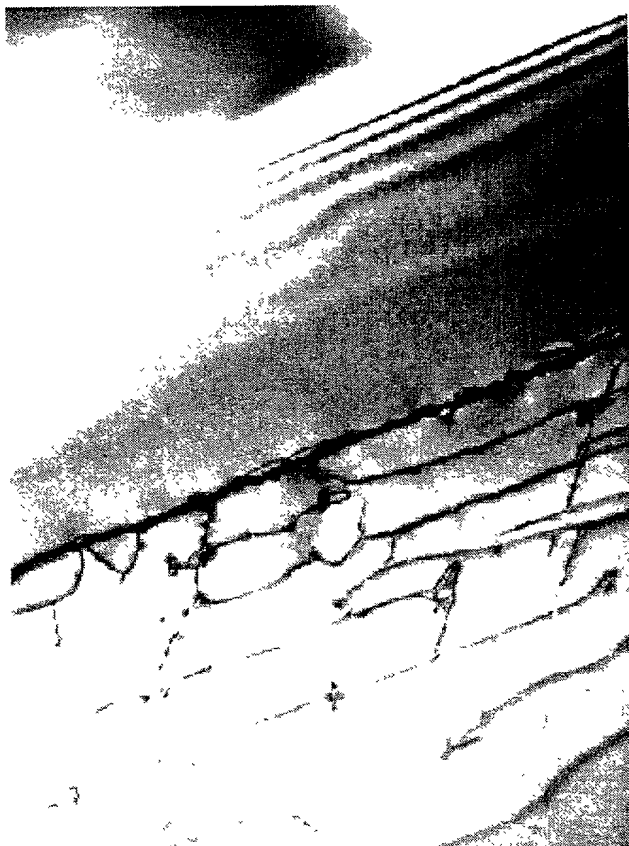


FIG. 4

FIG. 5A

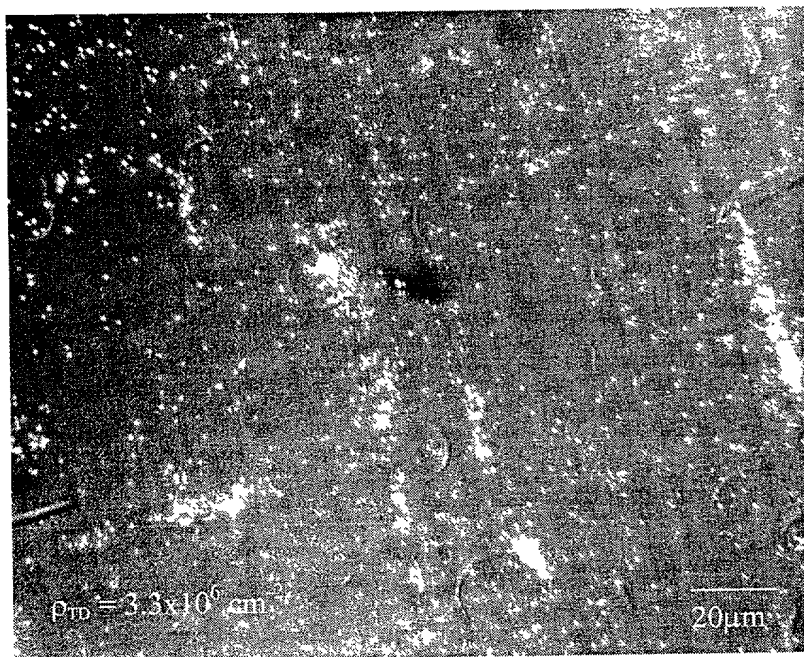


FIG. 5B

